

### Amaranth 101

Amaranth is an unconventional, nutrient-dense crop. Most varieties are tall with lots of broad leaves and have fluffy, reddish-purple plumes that hold thousands of tiny seeds that resemble poppy seeds. Amaranths come in two varieties: grain (like corn or wheat) or vegetable (like spinach). The seeds can be boiled to make porridge; ground into flour and used as a corn extender in mashes or flour extender in bread; pressed for oil; or popped whole like popcorn. The leaves can be made into steamed greens. Amaranth grows at a decent rate. Seeds are harvested within 4-5 months and the leaves within 3-6 weeks. Amaranth grain served as a staple food source for the Pre-Columbian Aztec society. Since Aztecs used amaranth for religious ceremonies, the Conquistadors discouraged the Aztecs from growing this crop, causing corn to become more common. Thus, amaranth became obsolete today except for very small, isolated farms in Mexico, Andes Mountains, Ethiopia, Nepal Himalaya, Mongolia, and India (Himachal Pradesh and Uttar Pradesh). *Amaranth: Modern Prospects for an Ancient Crop* written by the Board on Science and Technology amaranth could be incorporated into the diets of developing countries suffering from malnutrition and drought. Countries depend on cereal conventional crops (corn, soy, wheat, and rice) to meet their nutritional and caloric needs. However, most of these conventional crops take a lot of water and care to grow and do not provide as much nutrition as Amaranth.

Amaranth provides superior nutrition compared to conventional crops. Amaranth protein is superior to soy and dairy on the nutritionist's scale. When combined with corn, Amaranth is a complete protein, because the amino acids lacking in one is complimented by the other. Beans and rice is another example of a very popular complete protein. But amaranth and corn supplies healthier amounts of minerals, vitamins, essential fatty acids, roughage, and amino acid content compared to beans and rice. Amaranth leaves are more nutritious than traditional salad greens. Amaranth contains more iron and calcium than spinach and chard.

Amaranth tolerates harsh conditions compared to conventional crops, which is necessary in developing countries prone to drought. Amaranth "resists drought, heat, and pests, and adapts readily to new environments, including some that are inhospitable to conventional cereal crops" (pg5). A specialized photosynthetic pathway ( $C_4$ ) allows amaranth to withstand heat stress. The plants able to go through the  $C_4$  pathway lose less water through the leaf pores than plants only able to undergo the common  $C_3$  pathway. The  $C_4$  pathway allows amaranth to undergo photosynthesis with half-way open leaf pores.

The largest challenge of introducing amaranth to developing countries would be finding resources to further research the crop. The book ends with some research suggestions to create a strain that are shorter and won't easily blow over in the wind and ideas to make the grain more palatable. As an animal science major, I personally believe that amaranth should also be incorporated in animal diets to help lower the costs of animal feeds, thus lowering animal product costs (transportation, labor, meat, milk, or fiber).